



BETTERBRICKS

BUILDING COMMISSIONING

for better public buildings

CASE STUDY

COMMUNITY COLLEGES OF SPOKANE — ENHANCING TEACHING AND LEARNING FOR HEALTH CARE PROFESSIONALS



Health Science Building addition

In 1999 the Community Colleges of Spokane (CCS) initiated a major construction project to expand its health science facility at Spokane Community College. The project added nearly 40,000 square feet of teaching space and upgraded the architectural, mechanical, and electrical systems of the existing building.

Just as construction began, CCS in conjunction with the Washington State Department of General Administration's building commissioning program hired TESTCOMM, LLC to commission the facility.

The new facility better meets the needs of tomorrow's health care professionals with its classrooms, computer labs, distance learning center, support offices and facilities, vision care clinic, and dedicated health labs (dental, cardiovascular, respiratory care, nutritional therapy, and nursing skills).

COMMISSIONING QUICK FACTS

Building Name	Health Science Building, Spokane Community College
Location	Spokane, Washington
Project	Extensive remodel of existing building, plus a 2-story addition to the building
Commissioning Scope	Automatic temperature controls, HVAC, heating and chilled water systems, plumbing, electrical distribution, emergency power, fire and life safety systems, security system, medical gas system, lighting controls, roof systems
Building Size	16,746 sq.ft. (remodel) plus 39,814 sq.ft. addition. Total = 56,560 sq. ft.
Total Construction Cost	\$7,104,000
Total Commissioning Cost	\$82,820
Commissioning as % of Construction Cost	1.2%
Commissioning Cost per Square Foot	\$1.46
First-Year Cost Benefit	\$10,500
Annual Energy Savings	\$8,100 per year

PROJECT PARTNERS

**Washington State
Department of General
Administration**
Eric Benson

**Community Colleges of
Spokane**
Butch Slaughter

TESTCOMM, LLC
(Commissioning Agent)
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Malcolm Hain

L&S Engineering
(Mechanical/Electrical
Engineers)
Ron Burke, Jessica Morasch

Hartanov-Fuller
(General Contractor)
Steve Fuller

"The process used by the commissioning agent found problems that would have otherwise plagued the facility for years."

Butch Slaughter
District Facilities Manager
Community Colleges of
Spokane

PROJECT SCOPE OF WORK

In such a highly specialized teaching facility, it is critical for systems to operate properly. Among the building systems that TESTCOMM thoroughly tested and commissioned were:

- Heating, ventilation, and air conditioning
- Automatic temperature controls (calibration of actuators, temperature, pressure, carbon dioxide, and schedule controls)
- Heating water/chilled water
- Plumbing
- Main electrical distribution and emergency power
- Medical gas
- Fire and life safety; security
- Lighting control
- Roof membrane (leak test) and roof drainage

ISSUES IDENTIFIED

During commissioning several problems were identified that could have led to maintenance or operation difficulties, and/or to higher energy use. Important deficiencies found and corrected include:

- Sensors controlling the air-handling equipment were improperly installed, resulting in inaccurate readings of operating conditions.
- Heating water control valves were leaking, allowing hot water to flow to coils, which would overheat spaces. The problem was traced to debris on valve seats.
- Glycol system (heating and chilled water) relief valves were found piped to floor drains. Pipes were re-routed to containment drums, as specified, preserving the expensive glycol for reuse.
- The electrical equipment compartment was being "cooled" by a hot air supply. This was re-ducted to provide cooling air.
- The ground fault protection device on the main electrical service was not operating. The problem was corrected, averting possible damage to major equipment during an electrical fault situation.
- Natural gas supply pipes to the boilers and emergency generator were not properly supported, and a flexible hose at the generator was being used as a stepladder. These conditions posed safety hazards and might have led to premature equipment failure.
- Gas vent penetrations at the roof were not sealed, resulting in rainwater leaking into the mechanical room, posing electrical and equipment hazards.
- Of 60 smoke dampers tested, 40 failed to operate properly. Among the problems were dampers not opening or closing fully, motors not wired, no access doors, and failed actuators.

- Roof drains were not properly clamped to the roof. This could have resulted in damage to equipment and/or health hazards.

ENERGY IMPLICATIONS OF COMMISSIONING

The commissioning agent found several areas where energy was being wasted. For example:

- The CO₂ detector in a lecture room was giving falsely-high readings, triggering the air-handling unit (that serves the entire addition) to admit excess outside air. Re-calibrating the detector solved the problem.
- The heating and chilled water piping was insulated with a common blanket, allowing heat transfer between the pipes. This would have resulted in significant energy loss during “shoulder” seasons when both systems operate. To correct this, the pipes were insulated separately.
- Lighting controls in several classrooms and offices were not functioning properly. They were adjusted so that lights turn off automatically after 30 minutes of inactivity.
- The medical gas vacuum pumps were operating continuously (24/7) to satisfy the system’s pressure setpoint. The system’s designer agreed that the setpoint could be changed, which now allows the system to cycle on/off properly.
- Several fans were running continuously rather than responding to temperature changes. The fan controls were re-programmed to operate properly.
- While investigating HVAC system operation, the commissioning agent found a 6” hole in a medium-pressure air supply duct, allowing a large amount of air to leak into the ceiling return air plenum. Six other 1” holes were found at abandoned sensor locations. Holes were patched and the leakage stopped.

ADDITIONAL BENEFITS

In addition to energy cost benefits, other benefits that can be attributed to commissioning this project include:

- The college was assured that the building systems would operate properly, and with minimal initial maintenance.
- Approximately 98% of the 202 deficiencies discovered during commissioning were corrected (the remaining were deemed acceptable as found).
- Problems were found and resolved prior to affecting building occupants. One example—sound levels from HVAC units were checked in adjacent classrooms and found to be too high; a sound enclosure was added around the chiller and condenser fans were changed to a quieter model.
- Correcting problems during construction prevented future service calls and damage to building and/or equipment.

PROJECT BENEFITS

- \$10,500 in first-year cost benefits (such as fewer contractor call-backs, reduced change orders, problems corrected at design stage, etc.)
- \$8,100 in annual energy savings
- Identified and corrected defects in equipment, installation, and operation
- Problems found and resolved that could have impacted building maintenance, as well as occupant safety and comfort
- General contractor was pleased that the commissioning identified problems early in the project—improving customer satisfaction and limiting “call backs” for his subcontractors



Health Science Building during construction

FOR INFORMATION ON WASHINGTON'S COMMISSIONING PROGRAM



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BetterBricks
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WHAT IS COMMISSIONING?

Building commissioning is a systematic and documented process of ensuring that building systems perform according to the design intent and the owner's operational needs.

Commissioning is used in both new construction and existing buildings.

Commissioning:

- Provides a better environment for occupants
- Reduces indoor air quality problems
- Reduces occupant complaints
- Reduces contractor call-backs and warranty issues
- Reduces energy consumption and operational costs

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